

THE ROLE OF REFLECTION IN PROFESSIONAL DEVELOPMENT OF A SCIENCE INTERN

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ABSTRACT

This study focuses on how a pre-service teacher sees her engagement with her learners in science during her period of school internship. The researcher, a teacher educator was an observer of the context and the classroom processes. The data in the reflective journal of the intern are therefore, cross-validated by the researcher's actual observations. The class room observations and in-depth interactions with the intern helped the researcher to situate the reflections of the intern in an appropriate context of the learners and the school ethos. A thematic analysis of the narratives provides substantial insights into the intern's science related pedagogical conceptions and strategies, understanding of learner behavior, impact of contextual factors and their dynamic interplay. The findings of the study help in understanding the role of reflection in the professional development and also help in understanding the dynamics of contextualized pedagogy in science.

KEYWORDS: Contextualized Pedagogy, Narratives, Professional Development, Reflection

INTRODUCTION

In a teacher education programme at pre-service level the school based internship is an extremely important phase to provide field experiences to the prospective teachers for their professional development. During this period the interns do engage in 'reflective thinking' wherein they critically look at their own teaching, the behavior of their students, the school ethos, their own beliefs, anxieties and apprehensions. Through this multi-perspective lens they try to rethink about their teaching practice and try to reconstruct it as praxis (Calder head, 1989, Cleft, Houston & Pugach, 1990). Schon (1987) in his book endorses "reflection in action" as a process which requires practitioners to "remake their practice worlds", and "promote flexibility and creativity". If this is the purpose, then analysis of these reflections would be meaningful to gain insights into the trajectories of personal-professional growth of the prospective teachers. Britzman (2000) had stated that there is little understating regarding how those trying to teach actually learn from their practices, their students, or their incidental anxieties and contextual dimensions.

Research on teachers' knowledge, beliefs, and thoughts has shown that teacher candidates approach teaching with a plethora of initial beliefs and ideas about teaching. Their knowledge, however, tends to be based on simplistic views of teaching and learning in the classroom, and hence may not be "well adapted to teaching" (Calder head, 1991, p.532). It is only when they reflect upon their knowledge critically that they gain pedagogical and personal insights to become better teachers.

To promote reflective thinking, the journal writing has been used in teacher education. The reflective journals can activate teacher candidates' thinking and facilitate meaning making during the learning process (Cole, Raffier, Rogar & Teacher, 1998), they can serve as a means of generating questions and hypotheses about teaching

and learning (Richards, 1998). Through questioning their own assumptions, teacher candidates raise their awareness of teaching and develop a sense of ownership of their future work (Daloglu, 2001). As teacher candidates engage in journal writing, they are able to develop a habit of reflection (Yost, Sentner, & Forlenza- Bailey, 2000). According to Elliott (1991), journals of teachers may contain observations, feelings, reactions, interpretations, punches and explanations. In a way the journal is a potentially rich research tool.

RESEARCH QUESTIONS

The researcher as a teacher educator wanted to examine the situations arising in and beyond the classroom and how the teacher-intern takes them and builds up further on them. The research questions posed were:

- How did she engage and support the learners to enable them to understand concepts in science.
- What learner behavior stimulated the thinking and impacted the pedagogical ideas of the teacher intern?
- What did her reflective thinking pattern reveal about her attitude, and feelings about the context of her school experience as an intern?

CONTEXT AND METHOD

The study was located in a Government School of Delhi; the school was only for girls and had classes from sixth to twelfth. The researcher was there as a mentor to observe and facilitate the school experience programme for the interns. The one thing that immediately struck about the school was that the whole school building was being renovated and so the classes were being conducted through make-shift arrangements on day-to-day basis. There was a problem of material availability due to no set arrangements but on the whole the school staff was very cooperative.

The major tool for the study was the reflective journal that was regularly maintained by the intern. The journal had entries on a weekly basis. The journal writing was spread over a period of ten weeks. The researcher as the mentor was with the intern observing her teaching, interacting with her intensively at individual level as well as at the group level along with five other interns. In a way, the researcher was also a part of the context during the experiential phase of the intern. This helped the researcher to triangulate the data in the reflective journal in its proper context. The writings in the journals, building up on the lived experiences are 'narratives' that needed to be probed and analyzed in the contextual framework the school ethos and learner groups so as reach near-reality meaning making

NARRATIVE ANALYSIS

The researcher undertook a *thematic analysis* of the narratives in the journal. The narratives were analyzed under four themes, namely – school ethos, understanding the learners, science pedagogy and personal feelings and experiences. The journal content under various themes was considered in a time frame of three phases: Initial (2 weeks), middle (6 weeks) and the final (2 weeks) making up to a total of ten weeks that account for the duration of the school internship. Some selected text from the narratives is presented as a sample of her articulation of her ideas, feelings and experiences.

Some Selected Text from Narratives

Table 1: The School Ethos

Initial Phase (2 Weeks)	Middle Phase (6 Weeks)	Final Phase (2 Weeks)
<p>".. I am still in initial phase, getting familiarized to the school which has some new surprises or shocks for me every day" "</p> <p>"...lack of infrastructure is the main problem in this school but it is surprising to see how they still manage to run classes"</p>	<p>"..construction work is going on. Every day the number of available rooms decreases. The classroom venues change very frequently. Classes are held in open ground many times."</p> <p>"..I hardly get much space to move around as so many things shifted into rooms. I had only 2sq.ft. of blackboard space to use"</p> <p>"..the students eager to learn and participate in spite of cramped space, are making all possible adjustments."</p>	<p>"...the school looks more in order now."</p> <p>"..helped student groups to perform in the morning assembly; earlier there was no assembly being held due to lack of common space."</p>

Table 2: The Learner

Initial Phase (2 Weeks)	Middle Phase (6 Weeks)	Final Phase (2 Weeks)
<p>"..the students are willing to learn and participate actively in discussions and activities..</p> <p>"..it was encouraging for me as a teacher to see the students reaching to conclusions through active discussion and demonstration".</p> <p>"..after the class was over, one of the girls came out of the class and asked me a stimulating question on collision and energy. I gave her some examples and explained to her- but the point is that she has started thinking and questioning and is trying to find explanations."</p>	<p>"..although it is an English medium section but the students are more comfortable in Hindi. When I asked them to explain the concept in their own words in Hindi, they were jumping to answer but when I asked them to 'define' in English, they were not that enthusiastic.</p> <p>"..the students are a bit uncomfortable with the thought process involved with numerical-solving as they are used to memorizing them"</p> <p>"..I did extra efforts to ensure that students try the right thinking process to apply formula in solving numericals."</p> <p>"..the students could observe and share their observations of activities, but I think they were having some problems while writing i.e. grammatical problems in sentence making</p>	<p>"..the writing skills of students have improved and they have started noting their observation in- their own words and explaining them in a systematic manner."</p>

Table 3: Science Pedagogy

Initial Phase (2 Weeks)	Middle Phase (6 Weeks)	Final Phase (2 Weeks)
<p>".. it's good that I have to teach science which as a subject has lots of activities to make the students more actively participative in the class"</p> <p>"..the chapter 'sound' has plenty of interesting activities"</p> <p>"..I had asked the students to make some musical instruments so that they can understand vibrations. The students had used their imagination and were jumping to show their creations. I felt very energized to see their delighted faces."</p>	<p>" ..I asked the students to give examples of situations where 'friction' plays a role. The students responded well. <i>So a child has the knowledge according to his age and stage, the need is to frame questions so that he/she can put the knowledge in proper words</i>"</p> <p>"..I realized that if <i>once the students are allowed or given chance to apply their brains, they will surely try to do it and develop their own methods to solve problems.</i></p> <p>".. laws of reflection of sound were elicited from students and that too in proper words"</p> <p>" ..<i>Students learn better when they observe and infer by themselves, rather than by just listening to the teacher, the students could recall their observation even after 4-5-days</i>"</p> <p>'..a student asked- given the high frequency of ultra sound waves can it harm internal organs or foetus? <i>It shows the students are thinking critically</i>" given a chance the students learn by them selves by performing actives"</p>	<p>".. explained to students about creative project that they could do and why do we need to do it".</p> <p>" the students were very eager to know the consequences of the increased concentration of carbon dioxide in the atmosphere and composition of atmosphere on other planets. <i>It seems the students like to imagine things</i>".</p> <p>"..the students are performing group activities like little girl scientists at work"</p> <p>".. in every class I try to introduce a couple of new technical words with proper explanation of their meaning and usage.</p>

Note: The italicized phrases indicate theoretical anchoring or analytical reflection

Table 4: Personal Feelings and Experiences

Initial Phase (2 Weeks)	Middle Phase (6 Weeks)	Final Phase (2 Weeks)
<p>".. both my learner groups are very energetic, the challenge will be to be channelize their energies in the right direction."</p> <p>".. I am happy about one of the girls asking thoughtful questions but I want the whole class to think".</p> <p>"..the students are used to science by reading book method"</p>	<p>"..the regular teachers had to go for election duty so we were given plenty of substitution periods"</p> <p>"..the work load has increased as many school based assignments to be done". "</p> <p>"..the school Principal has also given a decoration work.</p> <p>"..the things are becoming difficult day by day. But toughs get going when goings get tough"</p> <p>"".. I am trying to help students in improving their writing skills.</p>	<p>"..now I do not have to make any efforts to maintain discipline in the class as it was in the beginning of my teaching."</p> <p>".. this was our final weeks this school. It is still hard to believe that I don't have to prepare lesson plans just after writing this entry."</p> <p>".. our final day was a very emotional one, our students were all weeping and sobbing when they came to know that we would not be coming any</p>

	<p>I check their note books and try to give individual feed back. I have realized that it is my duty to ensure that my learners are able to express in writing what they have learnt.”</p> <p>"..Today I got a chance to play badminton and do skipping with students in their games substitution period. I was very happy.”</p> <p>".. Preparing a song with my students was an experience in itself. I noticed that some girls who were not very active in classroom discussion were very cheerful while practicing for the song.”</p>	<p>more to their school"</p> <p>"this has been a wonderful journey. On the first day of school experience programme, I could have never imagined the last day as it has been.</p> <p>.</p>
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Insights Drawn from the Narrative

The narrative text above reveals some ‘predominant strands’ of thinking and action on the part of the intern, which in turn provide insights on the intern’s cognitive frame of reference and understanding, her attitudinal inclinations and how she negotiated change.

- **Personal Feelings, Experiences and Attitude**

Initial Phase

- A positive attitude towards learners.
- Somewhat apprehensive about the not-normal conditions in school due to renovation work going on.
- Wants to make efforts and take up challenges.

Middle Phase

- Perseverance and seriousness to complete all tasks even in adverse conditions.
- Concerned and making efforts for all round development of her learners
- Efforts for good rapport building during beyond the classroom situation

Final Phase

- Growing fondness for learners
- Sense of achievement from students’ learning outcomes
- Happy with changes in learner behavior

Science Pedagogy

The narratives had maximum content on this theme focusing on subject content nuances, demonstrations, group and individual activities, questions raised by students, creations by students etc. The writing style here was mainly

descriptive, interspersed with reflective linkages with ‘science process skills’, thinking skills and perceptions about the nature of science.

Initial Phase

- Fascinated by effect of activities on learners
- Encouraged active participation of students in discussions

Middle Phase

- Relating science learning to the tenets of constructivism through classroom based experiences.
- Sees problem solving as way to *empower* learners with mental proficiency.
- Sensitive to situations of developing critical thinking
- Designs learning experiences to encourage observation and inferring by students. Thus, conscious about the development of ‘Science Process Skills’ among learners

Final Phase

- Encouraging for creative thinking in Science learning
- Efforts to create a continuing interest in science.

The Learners

Initial Phase

- Sensitive to learners’ initial disposition
- Goes for deeper understandings underlying students’ actions.

Middle Phase

- Although a teacher of science but concerned about language related problems the students were facing and helps them in a sustained manner.
- Makes efforts to develop suitable thinking processes to help students overcome the problems in numerical solving.

Final Phase

- Happy to see a substantial improvement in her learners regarding writing skills and developing explanations in their own words.

The School Ethos

Initial Phase

- Surprised and apprehensive because of the chaotic conditions prevailing due to the renovation work

Middle Phase

- Efforts to make possibilities for good learning

Final Phase

- Became active participant in school practices and activities

DISCUSSIONS

Coming to the research questions posed in the beginning.

- **Engaging and Supporting the Learners to Facilitate their Conceptual Understanding in Science**

The text of some parts of the intern's narrative in the three phases of internship highlights her sensitivity to the learners' context and disposition and her gradual understanding about the language related problems with which she found her students grappling. Her resourcefulness in facilitating learners in understanding the concepts in science through gradual transition from their first language Hindi to the second language, English also emerges. In the final phase she is happy to see substantial improvement in the writing and explaining skills of her students. She is able to spot flashes of critical thinking and imagination among her learners and wants to build these up further, so that all her learners become proficient in critical thinking. The open and conducive learning environment created by her probably encourages her students to ask questions even after the class.

- **Dynamics of Science Pedagogy**

The analysis of the journal content shows maximum coverage relating to the details of introduction, discussions, questions, demonstration and student activities, learner interaction and students' questions regarding the concepts in science. Her strategy is to provide rich space for classroom interaction and further the learning experiences of her students, recognizing their needs and characteristics. She then goes on to making efforts to provide opportunities to students for developing the various 'science process skills and thinking skills' through activity oriented contextualized inquiry. It is interesting to note how she sees the problems solving ability as a means of 'mental empowerment'. It may be inferred that she attempted to build up scientific temper through critical thinking and perceived her learners as active constructors of knowledge. Perhaps, disturbed by the 'book reading method' in science teaching, she created situations for 'active learning', found spaces for creative thinking and identified flashes of imagination among her learners. She also made conscious efforts to create opportunities whereby her learners sustain their 'passion for science'

- **Reflective Thinking Pattern**

The narratives show initially a descriptive stance of what was actually transpiring in her classroom and in her mind. Gradually they move on to a more analytical approach, informed by some theorization. At times there are feelings of apprehension about the ad-hoc arrangements for classes, some kind of stress is also visible due to increasing workload on the one hand but, on the other hand there are expressions of delight on achieving some pre-set targets related to learner behavior. It is thus an interesting array of personal feelings. The reflections are by and large learner oriented, sensitive to learner dispositions, their problems and their excitement and propensity to learn. The reflections indicate a positive attitude, and a willingness to take up challenges, emanating from tough and demanding situations in the school. The three phases of her internship indicate her steady evolution as a facilitator to her learners and as a reflective practitioner.

CONCLUSIONS

Reflection is not just a point of view, but rather a process of deliberative examination of the interrelationship of ends, means and contexts (Huang). The perceptions change with times and the actions and events seem to acquire different meanings and implications, as apparent from the various phases of the internship undergone by the prospective teacher. The feelings and emotions in the narratives link to the implicit nuances relating to learner behavior and interaction, conceptualizations in science and contextual constraints. The content and pattern of reflection brings out a person's interpretation of roles and strategies to be adopted within a particular situation. This study suggests that the reflective journals seem to have a strong potential to be instruments of self-growth and for providing insights into contextual dimensions of pedagogical practices, especially for the professional development of prospective teachers.

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